

ABSTRACT OF THE DISCLOSURE

A free space all-optical crossbar switches light from a plurality of sources onto a plurality of receivers, in any arbitrary permutation or combination (including one-to-one and many-to-one permutations). The sources and receivers may, for example, be single mode optical fibers. The polarization of the light from each source is controlled by a series of polarization control devices associated with the source so as to obtain desired angular deflections through a series of polarization-dependent angular deflectors in a first deflection unit. A lens may then direct the light from each source towards its desired receiver. An optional second deflection unit containing polarization control devices associated with individual receivers redirects the light so that it is incident normally on the receivers, an advantage if the receivers are single mode optical fibers. Alternative embodiments are described to reduce the number of optical components and to provide uninterrupted high speed data flow.